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Commercially Driven Taxonomy: the Necessity of "Knowing" Species

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Taxonomic inflation, the raising of an organism to a different taxonomic state to exaggerate its importance, is a direct contributor to inflated estimates of endemism, often with a geopolitical bias (Issac *et al.*, 2004; Harris & Froufe, 2005). Taxonomic inflation reflects the long standing issue in the classification of nature, as higher ranks are erected and the taxonomy of intraspecific ranks is relegated in favour of newly named species. There are currently three postulated causes for taxonomic inflation: (1) the discovery of new species where, taxonomic inflation is often a reflection of the "rediscovery" of new species buried within a polytypic nature of an organism by supposedly recognizing cryptic diversity (Tattersall, 2007; Dubois, 2008); (2) the changes in the systematic approach to the classification of organisms and the author's failure to clearly identify which one of the many different "species concepts" they utilized in elevating to species status organisms which were previously accepted as forms, varieties or subspecies (Tattersall, 2007; Dubois, 2008); and (3) a consequence of academia and the need for taxonomists to publish, as highlighted by inflated species recognition by authors and unwarranted descriptions that are not justified by the evidence for divergence (Dubois, 2008; Sundberg & Stand, 2009; Bebber *et al.*, 2014). We argue for a fourth cause for taxonomic inflation. That is, the economic incentives to specimen dealers seeking to maximize marketability of organisms by elevating an organism to a different taxonomic state. Fundamentally, there needs to be a realization that, while the commercial value of species is a complex commercial issue subject to market forces, species values will increase as dealers chose to utilize new taxonomic names to create marketable opportunities. Therefore, it is important to recognize that taxonomic inflation is also a by-product of the differing functions of nomenclature depending on the needs of the user, be it the taxonomist seeking to describe nature, the dealer seeking to maximize economic profit, or the systematist concerned with the demarcation of units that are significant in evolutionary terms.

Commercial taxonomic inflation can have significant impacts on the systematist working to formulate an understanding of the evolutionary patterns of collectible organisms, such as molluscs. The primary problem arises during the revision phase, when the status of the organisms to be included within a clade is determined. Splitting existing taxa, or the elevation of clines and forms to full species (or other infraspecific ranks), is often accompanied by a failure to provide context to the species concept used to designate that organism, leading

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to taxonomical confusion. The problems of taxonomic inflation, irrespective of cause, can only be mediated when there is acceptance of the need to explicitly identify the taxonomic concept being used, facilitating an explanation of the differing needs of various taxonomists that might be undertaking the classification (Agapow & Sluys, 2005; Knapp *et al.*, 2005). Explicitness in conceptual approach to the delineation of species also enables the taxonomist, attempting to moderate inflation, to evaluate the contextual relativity of the organism that is being named or reclassified. Contextual relativity reflects the real world applicability of the species concept in terms of the different needs of the various taxonomic users. Further, this necessitates a tolerance for taxonomic freedom to choose species concepts that delineate taxa to meet the diverse requirements of the users of nomenclature. The species term, without conceptual context, therefore becomes a rhetorical device used by a taxonomist, irrespective of terminological accuracy or appropriateness of use (Magnus, 1996).

Taxonomic inflation is a natural by-product of the diversity of taxonomical users, as organisms are classified in ways that reflect the needs of those who utilize taxonomic nomenclature. Commercial taxonomic inflation is a direct by-product of the increasing value of organisms on the collector market, and as the value of organisms increase, so will the market forces that implicitly drive the process of delimiting species. To enable critical evaluation of any new taxonomic entity it is imperative that the criteria for species demarcation be disclosed. This disclosure will mitigate the effects of taxonomic inflation as users are able to recognize the significance of the new species even if this comes at a cost in terms of taxonomic acceptability to some users.

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